REMARKS

Claims 1-2, 4-16, 18-21, and new claims 41-43, appear in this application for the Examiner's consideration. Claims 22-40 are currently withdrawn from consideration but it is understood that these claims will be rejoined when claim 1 is allowed, since they all ultimately depend from claim 1.

Regarding claim changes, claims 3 and 17 have been cancelled and the feature recited therein, "freeze drying", has been incorporated into claims 1 and 2. Claim 21 has been amended to more accurately present the bead diameters. Support for this amendment can be found on page 14, lines 9-11 of the present application. New claim 41 has been added comprising the subject matter of original claim 21. New claim 42 has been added to define an additional feature of the carriers, support for which can be found on page 19, lines 2-8 and in Table 1 on page 20. New claim 43 has been added to further define the porosity of the carriers, support for which can be found on page 19, lines 11-13. As no new matter has been introduced by any of these changes or additions, they all should be entered at this time.

Claims 1, 2, 7-13 and 16-21 have been rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 4,818,530 to Marois et al ("Marois"). Marois teaches pelletization of fungal spores for use in biocontrol and discloses that pelletization of the alginate requires calcium salt and gelation proceeds faster as the concentration of the salt solution is increased. However, the pellets in Marois are prepared from gelled alginate and contain fungal spores dispersed throughout. And there is no teaching or suggestion of the use of a porous carrier, which is disclosed and claimed in the present invention.

Moreover, in Marois, drying of the alginate gel pellets is optional (col. 4, lines 21-26). It is well known in the art that a dry porous structure in a hydrogel, for example alginate, can be obtained either by foaming (physical, chemical or biological introduction of gas), or by vacuum-drying or freeze-drying, but none of these procedures are utilized in the preparation of the alginate pellets disclosed by Marois. In contrast, the hydrocolloid carriers of the present invention are obtained by freeze drying and comprise low density, porous beads, and viable microorganisms. As Marois fails to teach or suggest the present invention, the anticipation rejections based on Marois should be withdrawn.

Claims 3-6 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Marois in view of U.S. Patent No. 4,956,295 to Sudoma. Sudoma teaches the stabilization of

dried bacteria in particulate carriers. Specifically, Sudoma teaches dilute admixtures of dried viable bacteria with particulate carriers and requires that the bacteria be dried prior to admixing with the particulate carrier (see col. 4, lines 51-68). In addition, a requirement of the particulate carriers of their selection to have "[a] relatively low water absorbing capacity, such as less than one percent (1%) of its moisture free weight.."(col. 3, lines 40-42). The particulate carrier of this type is disclosed to be an inorganic carrier salt (see col. 3 line 60 to col. 4, line 3). The admixture in Sudoma requires a minor proportion of silica gel, which is selected to have a high water absorbing capacity (col. 3, lines 44-50).

Marois does not teach porous compositions and Sudoma requires an admixture of pre-dried bacteria, a non-moisture absorbing organic salt carrier and a water absorbing silica gel absorbent. Thus, neither reference teaches or suggests freeze dried beads. Accordingly, Sudoma does not remedy the deficiencies of Marois. Therefore, Marois and Sudoma, alone or in combination, fail to teach solid porous cellular hydrocolloid carriers comprising freeze-dried hydrocolloid beads having a desired porosity and comprising viable microorganisms entrapped therein. Thus, the rejection of claims 3-6 under 35 U.S.C. § 103(a) should be withdrawn.

Claims 14-15 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Marois in view of U.S. Patent No. 5,030,562 to Elliott et al ("Elliott") or U.S. Patent No. 4,764,371 to Pusey et al ("Pusey"). Elliot teaches a method of screening for bacterial strains which can inhibit the growth and spread of a species of weed that compete with crops while Pusey teaches post harvest control of brown rot on stone fruit. As explained previously, Marois does not teach the porous freeze-dried beads of the present invention, and neither Elliot nor Pusey remedies this deficiency. Freeze-dried beads have a porosity that is not exhibited by non-freeze dried hydrocolloid gels. Further support to demonstrate the lack of porosity in hydrocolloid gels that have not been freeze dried is found in the attached paper entitled The Behavior of Hydrocolloid Coatings on Vegetative Materials (by V. Hershko & A. Nussinovitch) from pg 756 second paragraph to pg 757, left col. 1st paragraph. Thus, even if a skilled artisan is motivated to combine Elliot or Pusey with Marois, she will not achieve the present invention because of the lack of teaching of "freeze drying" in the cited references. Thus, none of the products resulting from the combination of these references will have the desired porosity and inclusion of live microorganisms as do the freeze dried

beads of the present invention, since this product results from a process that is not conducted by the cited art. Moreover, in Pusey, the test bacteria are directly applied to the surface of the fruit and, therefore, Pusey teaches away from applying the bacteria to the soil or plants (see col. 2, lines 41-51). Thus, it is unlikely that a skilled artisan would even be motivated to combine Marois and Pusey to obtain the invention defined by claims 14-15.

Therefore, none of the cited references, alone or in combination, teaches solid porous cellular hydrocolloid carriers comprising freeze-dried hydrocolloid beads comprising viable microorganisms entrapped therein. Thus, the obviousness rejection of claims 14-15 under 35 U.S.C. § 103(a) should be withdrawn.

The utility of the invention is illustrated in two scientific papers of the inventors. In the first, Irregular Textural Features of Dried Alginate-Filler Beads, illustrates the structure of the claimed beads and describes the advantages that are obtained from such structures. As such structures result from freeze-drying, prior art that does not utilize a freeze-drying step cannot achieve such structures. The other paper, Mutual Relationships Between Soils and Biological Carrier Systems, illustrates the use of beads containing chitinolytic bacterium as a biocontrol agent. This paper also compares the performance of the inventive beads with non-dried counterparts to illustrate the unexpected advantages provided by the inventive beads. In general, the inventive beads enable a more efficient transport of cells and their products to the soil so that higher bacterial densities and chitinolytic activity is obtained. These papers support the novelty and non-obviousness of the present claims.

In view of the above, it is respectfully submitted that all current rejections have been overcome and should be withdrawn. Accordingly, the entire application is believed to be in condition for allowance, early notice of which would be appreciated. Should the Examiner not agree, then a personal or telephonic interview is respectfully requested to discuss any remaining issues and expedite the eventual allowance of this application.

Respectfully submitted,

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